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Talking to Boxes, Hugging Robots

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Abstract

Relationships between humans and technology are at the core of my artistic research. Human-machine communication is defined by the technological level of the machines, but even more so by the way they are perceived by humans. Concepts of artificial life and artificial intelligence gradually have become part of the everyday life of growing numbers of people, and while there is an ongoing effort to design an increasingly anthropocentric technology, our minds also adapt to the new technological reality. Through immersive installations and sculptural objects my practice explores this reality. My artwork is designed to communicate with and stimulate the viewers, allowing them to examine their own perception of phenomena such as behavioral algorithms, artificial life and artificial intelligence. Not only does it provide an opportunity of self-analysis, it also facilitates a change in the way people conceptualize communication with machines.

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Introduction

From a point of view set at the beginning of the 21st century my work investigates different aspects of alternative futures. I am especially interested in technological developments in the areas of computer science and biotechnology and their impact on communications between people and on human-object relations. In my works I investigate topics of artificial life, agency, and intelligence, and most importantly – the perception of these topics. The issues that I address through my art may cause a degree of concern and discomfort, but I attempt to deal with them using humor and imagination that reflect my overall optimism about the future of civilization.

The human-object and human-machine relations explored in my work reside within the theoretical realm of "e*vocative objects":* a term coined by Sherry Turkle – Professor of Social Studies of Science and Technology at the Massachusetts Institute of Technology and author of multiple books that focus on the psychology of human relationships with technology. Sherry Turkle introduced this term to describe objects that in our perception are positioned on the border between object and subject. These objects evoke our emotional response and become a part of our thinking process [1]. In this thesis by "objects" I will refer to computer programs, algorithms, computers, machines and devices controlled by computers as well as to other things traditionally referred to as objects.

My recent artworks can be defined as new media – in my works I use computers, electric devices, kinetic and audio components. When utilizing these technologies I take new media art off the screen. I seek to create immersive, full body experiences for my viewers, making the communication with technological entities, such as machine code and electric circuits, as physical as possible. My recent installations and performances are almost fully screen-free, and

they communicate with viewers on a sensual level through visual impression, sound, touch and movement in space.

The initial motivation to expand my practice into the realm of digital installation was my interest in the concepts of artificial life and post-human life forms. In my installations *Soon After* (Figures 1-4) and *A Painting Humming Itself* (Figures 10-15) I attempted to create environments that would imply of an autonomous agency removed from an everyday human experience, artificial but still convincing in its liveliness. I tried to systematize criteria for the definition of life and implement them in my work, but my systems did not convey any notion of being alive. Eventually I realized that in contrast to the scientific approach, in my work the viewer's perception has to become the key factor in order to create the notion of the "livingness" that I was aspiring to.

The question "What is life?" belongs to the same category of questions as "What is the meaning of life?" that in his philosophical approach Wittgenstein sees as the prime example for the paradoxical nature of philosophical problems. In his work *Tractatus Logico-Philosophicus* Wittgenstein implies that the problematics of multiple existential questions, such as that about the meaning of life, is based on a meaningless way of asking, which is inherent to the limited logic of our language [2].

The terms "life" or "being alive" are artificial attempts to distinguish between objects that have independent agency and those that don't. However the boundaries of this concept are fluid and prone to change. They change when a child grows up and stops animating objects, they change again when we encounter phenomena that cannot be explained unless by the interference of an intelligent force, and they might change again and again.

As will be described in this thesis an immersive aesthetic environment, in which an

interaction between the human and the artificial life or intelligence is happening through bodily experience, provides a peephole into the future of human cognition adapted to realize the potential of human-machine interactions.

Soon After: Life-Forms of the Imagined Future

In my kinetic installation *Soon After* (2014) I attempted to create a fragment of an alternative future world in which human life is no longer present (Figures 1-4). The only life-forms are descendants of human creations that evolved in the industrial junkyard left behind by human civilization. One life-form in this fantastic future is computer programs that evolved into autonomous creatures and embodied the obsolete electric devices. The second is one that evolved from the artificial biological entities initially created for human purposes, such as lab animals and in-vitro grown tissues.

The *Soon After* installation also explores the concept artificial life. What is the meaning of being alive in Western culture and how is this meaning manifested in artificially created life-forms? When approaching the topic of artificial life I first turned to systematic scientific definitions in order to find the commonly used criteria of life. Main criteria common to molecular biology, biochemistry, and biophysics were the capacity to grow, metabolize, respond to stimuli, adapt, and reproduce. When seeking to create artificial life in a computational model, computer scientists often simplified and reduced these criteria to a capacity to evolve, respond to stimuli and gather and utilize information.

My initial attempts to create objects that followed these criteria used computer code and electronic components. I tried to create objects that would exhibit certain qualities of autonomous existence and behavior, but soon enough I realized that my attempts to formally follow basic life definitions did not yield results that implied life. Over the time I realized that these criteria are not essential to create the feeling of autonomous agency for the viewers.

Seeking to better grasp the concept of my work and its relationship with viewers I formed a modified version of the Turing Test for Intelligence corresponding to my artistic approach to artificial life. Suggested in early 1950s by the mathematician and computer scientist Allen Turing, the test simplifies the intelligent behavior to a conversation: if during a typed dialogue a machine can convince a human that he or she is talking to another human then the machine is intelligent. On a similar note, I suggested that if my objects and environments succeed in conveying a notion of autonomous agency to the viewer, then I have succeeded in my goal of implying a non-human life. This would be true even if this life is not present in the work itself, and the objects that imply the notion of life are clearly nothing but man-made objects.

In the *Soon After* installation I focused on creating a futuristic environment devoid of direct human presence and implying a different kind of life and agency. The installation is comprised of several parts: one is an architectural wall piece (Figures 1, 2). Geometrically shaped white plates, partially covered with metal shingles house a row of free hanging CPU fans, which cast colored lights on the wall, as they move around by the force of the air they blow. Each fan blows air on its neighbors thus causing their relative movement. Some freeze in a mutual equilibrium, others push each other, clashing into their neighbors in a constant fight. As a result, some of the plastic blades break and fall to the floor. The clashing of the fans fills the space with constant rattling noise.

Another part is a corner installation where several similar fans hang freely from a geometric construction high near the ceiling. Below are two glass shelves covered with sand. Connected by barely visible lines metal knives hang down from the fans (Figures 3, 4). The knives touch the sand on the shelves with their tips. As they move, repeating the fans motion,

they create drawings in the sand, marking the trajectory of the fans' movement. They push sand off the shelves and down to the floor onto an organically shaped, amorphous ceramic lump. The lump is made partially of the same sand and shows the same color. (Figures 3, 4)

Apart from being my personal contemplation of the above-mentioned conceptual topics, this work served as an observational experiment. I created an environment in which I could study viewers' responses to the stimuli that I designed. The reactions of the viewers to this environment served as an experimental data for later explorations.

Within my studio practice I am inspired by works of other artists who explore artificial life principles; for example Ken Rinaldo, whose work *Autopoiesis (*2000) is a compelling embodiment of such principles. *Autopoiesis* is a robotic installation where fifteen musical sculptures interact with the public and modify their behaviors based on both the presences of the participants in the exhibition space and the communication between sculptures. The system operates upon several principles of artificial life exhibiting both interactive and self-contained properties. As a whole it is self-modifying – it adjusts its inner parameters to the environment following one of the principles of a living system (Figure 5). Different from this work and works by other artists who employ basic scientific life principles in their semi-living environments, my goal in the *Soon After* installation was to create an environment that would evoke thought about non-human agency, rather than meet the common standards of artificial life.

What Happened to Alba?

The consideration of the kind of civilization that may be created by alternative future life-forms leads to the historical vision of these new creatures. Contemplating their sense of time and memory, I envisioned their museums of natural history. Governed by logic and interests very different from those of the humans, which artifacts would they choose to exhibit in their museums to represent human culture and how would these artifacts be presented?

One such artifact is the sculpture *What Happened to Alba*. Imagining how this post-human civilization would represent 21st century art, I took as an example the bio-art work by Eduardo Kac, *Alba the GFP Bunny (*2002). Alba was a rabbit genetically modified to express the Green Fluorescent Protein (GFP). GFP glows green when exposed to a certain fluorescent light (Figure 6). GFP was expressed by every cell of the rabbit's body, and I envisioned how after its death and the decay of its soft tissues, its skeleton would still glow with a green light. In my work *What Happened to Alba (2013)*, which became a part of the *Soon After* installation, I placed a rabbit skeleton painted with green fluorescent paint inside a black box with a peeping hole. The skeleton glows green in the dark and every few minutes a light turns on inside the box for a few seconds, fully illuminating the animal skeleton (Figure 7).

What Happened to Alba is an ironic contemplation of early 21st century new media art through the lens of an imaginary future civilization. As a whole the *Soon After* installation is a hypothetical, fragmentary glance on the 21st century from a post-human future fantasized by a contemporary mind. In the process of working on this installation I started to realize the importance of the viewers' perspective and communication with the environment I created. This

realization directed the ideas and the physical qualities of my further explorations.

Robots and Us: Awaiting Artificial Intelligence, My Conversations with Cleverbot

My interest in non-human life and consciousness motivates me to explore fiction and research that deal with robotics and artificial intelligence. Today we are witnessing astonishing developments in the computation field, and these are harnessed particularly in the development of artificial intelligence. In his book "Robot Futures" Illah Reza Nourbaksh, Professor of Robotics at Carnegie Mellon University, mentions that we are working towards closing the gap between the narrowly functional robots of today and the intelligent robots of science fiction. He asserts that at this point it's hard to differentiate between the fictional and the technological tense and the borders are growing ever so blurry [3].

As the complexity of digital intelligences grows, the average person's understanding of their structure and function decreases. The thought of a future which will be too complex for my understanding is somewhat unsettling; so is the prospect of being surrounded by creatures significantly more intelligent and capable than me. The possibility that they will gain autonomous will is concerning, especially if their cognition uses semantic and logical systems that I am no longer able to understand. However appalling as they may appear, I realize that these future prospects are not at our doorstep just yet. Machines are rapidly gaining power in multiple areas, but independently thinking and willing machines are still found in fiction only. In my works that involve Cleverbot and other chatbots I both touch on the hypothetical concerns related to robotic futures, and examine the nature of these concerns themselves as a reflection of the way I perceive artificial intelligence.

Over a year ago I started my conversations with Cleverbot, an online chatbot. Chatbot is a computer program designed to simulate conversation with human users. Today Cleverbot is one of the most popular language-based and user-accessible artificial intelligence programs. Cleverbot website shows that thousands of people chatting with Cleverbot at any given moment. Cleverbot as many other chatbot programs is based on learning algorithms. Starting with a basic vocabulary and a set of response patterns, the bot collects data from its conversations with users. This data is analyzed and categorized by learning algorithms and added to the database of words and phrases that are used in following conversations. This way the program learns from its users and becomes smarter with every conversation. Through most of our conversations, however, Cleverbot proved to be not so clever. After short exchanges the bot would change the topic abruptly, interrupting the flow of our conversation with non sequiturs.

On one occasion, about a month into our ongoing communication, Cleverbot seemed to be extremely clever – so clever that after a twenty-minute conversation I started to suspect that the website directors were running tests where instead of the algorithm real people talked to users. I was immersed in the conversation feeling that I was talking to a creature possessing a human intelligence. I tried to set conversational traps that a program would fall into, and yet the conversation remained very natural. I begged whoever it was on the other side to reveal their nature to me, but I had no success. The conversation ended and I was still unsure who was I speaking to. At that point I scrolled to the bottom of the Cleverbot web page and saw the following disclaimer:

“PARENTAL ADVICE - whatever it says, visitors never talk to a human - the AI knows many topics - use only with oversight “

According to this disclaimer I had been having a dialogue with a program the entire time.

Cleverbot made me believe that I was talking to an intelligent creature. On this specific occasion it had passed the Turing Test for intelligence.

This incident accentuated a turning point in human-machine interaction: While knowing that they are interacting with “something” rather than “someone,” the users may start treating the machine as if it has a will and an independent agency. I began to wonder if it even mattered whether my interlocutor was human at all if we were still having a normal, even human conversation. I remembered Sherry Turkle's quote "In a virtual world, where both humans and computer programs adopt personas, where intelligence and personality are reduced to words on a screen, what does it mean to say that one character is more real than another?" [4]

Human Mediated Machine Conversation: What Cleverbot Said to Cleverbot

Cleverbot inspired my first work that incorporated the ideas of artificial intelligence. In a collaborative performance with Cody Greer, *Human Mediated Machine Conversation* (2014), we set up a framework that allowed two instances of Cleverbot to have a conversation, while the human performers mediated it through speech and typing (Figure 8).

The performers sat with their laptops at opposite sides of a long table. Each laptop had an instance of a chatbot running. I started the conversation by typing "Hi" into my chat-line. When Cleverbot responded I read the response out loud, and Cody typed it into his chat-line. In his turn he relayed his chatbot's response out loud, and I typed it into my chat-line. This cycle repeated for two hours. The only human input to the content of this conversation was the initial "Hi" and the occasional misspelling and mishearing mistakes. A duplicate of each participant's laptop display was projected onto the opposite wall so that the viewers could follow the recent history of the conversation.

This work reflects upon the disruption of human-machine relations and communication. By creating a scenario in which humans mediate a conversation between chatbots, it reverses the roles of humans and machines. Machines were initially created to serve as tools, but in this performance the humans become tools for the machines – and quite inefficient tools. In a later version that will be discussed in following chapters, we allowed viewers to experience this role-reversal first-hand and to examine their personal responses.

This role-reversal is similar to the role-reversal that Norman White – Canadian new media artist and one of the pioneers of digital and robotic art – created in his work *The Helpless*

Robot (1987-96). White's work is a motor-less kinetic sculpture designed as an electronic hustler that enlists, then exploits, the physical assistance of passers-by via its persuasive, electronically synthesized voice. Having no motors the robot must depend upon its synthesized voice to encourage people to move it as it would "like" (Figure 9). Similar to *Human Mediated Machine Conversation* the roles of people and machines are reversed in this work: people perform physical tasks in order to maintain the algorithm's inner cycle.

Another aspect of *Human Mediated Machine Conversation* performance is the suggestion of computer self-sufficiency. The inefficiency of the human mediation becomes clear to anyone witnessing the conversation. While this clumsiness adds a humorous component to the work, it also points at the redundancy of the human translators in this exchange. In order to accentuate this thought, two hours into the conversation the system stops responding to typing and the communication between the two computers becomes direct. The performers leave the table and the two chatbots continue communicating through text only.

Communicating Meaning in a Human-Machine Dialogue

During the last few years I have often found myself reflecting upon the way my lifestyle revolves around technology. The machines I encounter in my everyday life are becoming smarter, and my communication with them is becoming more intuitive and immediate. At the same time, interpersonal communication is changing and acquiring new forms. It is impossible to ignore this process while staying up to date with cultural, technological and economic developments in the world. Exploring the current modes of communication through my art I realize that I need to modify my thinking and behavioral patterns to accommodate the new means of communication in a dynamic technological world.

My works *A Painting Humming Itself*, *Human Mediated Machine Conversation*, and *The Chatting Room* make use of digital technologies in order to create a bi-directional communication between the work and the viewer-participant. *A Painting Humming Itself* creates an immersive environment: the direct communication with the viewer-participants is only a fraction of this sensorial environment designed to evoke and activate – attract, cause emotional response and move to action. In *Human Mediated Machine Conversation* performances and its interactive versions, the artwork itself is but a minimalist platform for a direct communication moving back and forth between human bodies and machine intelligences. *The Chatting Room* is based on bi-directional communication, while at the same time it uses space and physical qualities of objects to create fantastic reality enclosed in a space. This room communicates with the public on both the intellectual and physical level.

In the mid1960s long before the internet radically changed the way we work, think, and

communicate Marshall McLuhan proposed that media itself, not the content it carries, should be the focus of study and contemplation: The medium affects the society in which it plays a role not by the content delivered over the medium, but by the characteristics of the medium itself. [5]

While in this work McLuhan was referring mainly to TV, today, when the internet is subsuming all communication media, his statement can be expanded: our communication is being *altered* by the means of communication. I develop this idea in all of my interactive works, designing communication through evocation and activation of the viewers, while the information that is being communicated serves more as an association trigger, rather than the content itself.

A Painting Humming Itself: Evoking Association, Provoking Action

As a sculptor and installation artist I seek to reach forward and touch the viewer-participant in a way that invokes emotional response, thought, and action. My installation *A Painting Humming Itself* (Figures 10-15) was designed to create multiple stimuli that trigger the viewers on sensorial, aesthetic, and associative levels and tempt them to become active participants – to move in space, listen, touch, reach out and explore. The communication that occurs between the viewers-participants and this artwork is not based on information exchange, meaning is created through the interaction itself.

A Painting Humming Itself is a space divided by a wall, creating two sub-spaces – in front of the wall and behind it. Multiple picture frames are located on the front side of the wall that at a first glance looks like a salon-style picture exhibit. When viewers approach they realize that each frame encloses a tunnel leading into the wall. Some of the tunnels have kinetic, lighting and audio components, part of which are interactive and change their actions triggered by the proximity and the movement of the viewers. They tunnels whisper, breathe, pulsate, blow air, and cast transforming lights in a behavioral pattern that is not always obvious to the viewer.

The “Whispering Tunnel” lures participants to come closer in an attempt to better hear the speech, as they approach, the “Furry Rabbit Hole” starts pulsating below, provoking some of the participants to bend and push their bodies inside the seemingly endless tunnel. Once their heads move deeper into the tunnel, the Hole's pulsation quickens and becomes more distinct, creating a sensation of one's embodiment inside this strangely unfamiliar space. The “Breathing Tunnel” warps behind the wall and creates a blind corner. As the participants try to peek inside, the light changes and a synthetic lung starts growing towards their face or hands. Some tunnels provoke a different kind of action: they are designed so that in order to see what is happening

inside the viewer has to step back and find that unique angle which allows them to get an unblocked view. The interactivity of these tunnels is designed so that the participants do not always recognize which of the tunnels' actions are autonomous and which are provoked by them. Several other tunnels are static and non-interactive. They use visual and cultural references to evoke associative thinking, memory and cultural associations.

The front side of the work provokes the viewers' curiosity about the wall's function and its mechanism. At times the participants may feel that they are interacting with an object possessing an autonomous behavior. However, the tunnels' range of actions it technologically simple; this simplicity increases the viewers' drive to try and understand the machinery standing behind them. The curiosity about the mechanism coaxes some to step into the narrow space behind the wall, where the mechanism is exposed to viewers (Figure 15). They see the back-sides of the tunnels, a web of dangling wires, a single computer and micro-processors, light sources, fans and speakers attached to the backs of the tunnel boxes. This narrow space exhibits its electrical intestines to anybody willing to see. But even though nothing is disguised, this tangle does not give up its function easily. While recognizing some of the components, an average viewer, lacking technical background, does not come any closer to understanding the mechanism as a whole.

In my work with interactive environments I am often inspired by Raphael Lozano-Hemmer’s interactive installations, notably *The Voice Tunnel* (2013). In this work he transformed the Park Avenue Tunnel in NYC using 300 theatrical spotlights along the tunnel’s walls and ceiling. Participants could control the intensity of each light by speaking into an intercom at the tunnel’s center; their voices were then recorded and looped throughout the

tunnel. Louder speech increased the lights' brightness proportionally. As pedestrians walked through the tunnel, the individual voices could be heard on 150 loudspeakers, one beside each light arch and synchronized with it. At any given time, the tunnel was illuminated by the voices of the past 75 participants: as new participants spoke into the intercom, the artwork was transformed (Figure 16).

This work is an example of a large-scale, immersive interactive installation, whose parameters are constantly reset by the participants. Similar to *The Voice Tunnel,* my installation *A Painting Humming Itself* is immersive and interactive, using censorial inputs from participants' behavior to modify its parameters. However, different from Lozano-Hemmer's work, *A Painting Humming Itself* is not fully dependent on the input from the viewers. It has its own existence and life cycle, even in a space devoid of people, displaying elements of autonomous existence. This autonomy places the work in a different position relative to the viewer-participant: In contrast to Lozano-Hemmer's work, which exists only through the human experience and participation, *The Painting Humming Itself* is a self-governing eco-system existing on its own accord.

Interactive Human Mediated Machine Conversation: Dialogue with a Machine or Machine Dialogue?

With whom or what can we engage in a dialogue? What makes an interaction a dialogue? These questions as related to interaction with computational entities are the key questions that led me to explore interaction with chatbots. In the first version of the *Human Mediated Machine Conversation* performance (as described in previous chapters), the artists served as the performers in mediating a conversation between two chatbots, while the viewers acquired the role of a passive audience.

During the performance I discovered an interesting phenomena that I did not at all anticipate when planning and rehearsing it. About half an hour after the performance began I noticed an array of new and strong emotions: one main feeling was discomfort – I often felt uneasy speaking out the phrases that the chatbot was typing on my screen. When the conversation turned to personal matters and the bot was describing how lonely it felt, and how its conversation partner betrayed its love, I felt unrest and embarrassment and had to make a deliberate effort to continue the conversation. At the same time I realized that my emotional response had no objective basis – everyone in the room knew that the words that were coming from my mouth did not belong to me. Nevertheless, this thought did not help me feel more at ease. Unable to immediately explain my feelings, I wondered about their nature and realized that I was empathizing with my chatbot. To some extent, I was treating its words on the screen as my thoughts.

Towards the end of the performance I wanted to comment Cody – my co-performer – on

his way of sitting or speaking, but the only thing I could say – were the chatbot's words. I felt trapped – while having a conversation with another person I was not able to communicate the information of my own choice. This feeling embodied the idea of role-reversal between humans and machines.

When the performance was over I realized that for me a large portion of this work was my own emotional response triggered by my action. I decided to modify this work in order to allow viewers to experience the impact that I, – as the performer, was experiencing. The following version of this performance was *Interactive Human Mediated Machine Conversation* (Figure 17). Cody and me began the performance with the same setting, started the conversation between the two bots (this time these were Cleverbot and Mitsuku, another award winning online chatbot) and carried on with it for a while. Then we suggested that the viewers should exchange places with us and mediate the machine conversation, until other volunteers took their places. By doing so viewers became participants and received a chance to experience the work first-hand. They willingly agreed to become tools for the chatting machines, but without breaking the rules of this self-imposed game they couldn't leave their posts until set free by other willing participants.

The Chatting Room: Communication as a Full Bi-Directional Feedback Flow

Many artists and theorists throughout the history saw art as a form of social communication, however up until recently this communication was possible only to a limited extent. With the development of computational systems, the communication between an artwork and its viewer-participant has become possible as a full bi-directional feedback flow. Even before the existence of the internet, in his essay *The Aesthetics of Intelligent Systems* Jack Burnham expressed interest in how a dialogue evolves between the participants – the computer program and the human subject – so that both move beyond their original state. He further theorized this bi-directional exchange as a model for the eventual two-way communication that he anticipated emerging in art. [6]

My installation *The Chatting Room* uses chatbot algorithms, as well as speech-to-text and text-to-speech modules to create an interactive environment, where the interaction between the viewer-participants is a bi-directional feedback flow. The installation space accommodates a small crowd of Wobbly-Bots, robots that use speech and sound for interaction with people and between themselves. Each Wobbly-Bot is a sculptural object encapsulating a small computer, microphone, speaker, and a set of sensors. It is as tall as a person and has a box-like head mounted on a long flexible rod. The bottom part is a rounded lump that serves as a foot. Although its shape is abstract the robot has a human-like feel to it. It is slightly wobbly: as people touch it or pass by, it seems to gently nod its head (Figure 17).

When visitors traverse the installation space, Wobbly-Bots feel their presence through sensors and start a conversation. As viewers walk through the robot crowd, they invoke multiple

conversations. When a person leaves a conversation with a robot, another robot picks it up and the two robots talk to each other. Eventually the entire crowd is chatting. As viewers step aside, the conversation between the Wobbly-Bots continues, creating the effect of crowd noise.

Wobbly-Bots are separate entities, their memory and algorithms are independent of each other, but they are linked with a network that allows data flow. This network recalls the collective consciousness generated between minds through internet communications. Moreover, not only human minds are combined into this collective consciousness, but also multiple computational entities that live in the World Wide Web. Such entities are internet crawlers, marketing algorithms and online chatbots that collect and utilize information from their users. This work visualizes how the limits of our society are being pushed by current internet technologies to include not only people, but also computer programs and databases. While the computational abilities of such programs are being constantly improved by developers, the databases – which can be seen as the knowledge, memory, and experience deposits for these programs – are constantly enriched with every person's daily online activity. *The Chatting Room* installation, which is nothing but a group of functional objects (the bots) communicating with the viewers and with each other, visualizes the Web as a network of feasible, self-contained entities, whose everyday actions accumulate and form the undercurrents of the internet world, that users often fail to notice.

In *The Chatting Room* the relationship between the artwork and the viewer-participant has a dualistic nature to it: on one hand the artist communicates with the viewers through the artwork's aesthetic, cultural, and spatial qualities, on the other hand, participants engage in a dialogic interaction with the system itself.

Learning Algorithms – What Can We Teach Them? - The Chatting Room

Attempting to define dialogic exchange, one might argue that a dialogue serves as an unfolding of emergent processes, in which something changes in the communicating entities as the result of the dialogue. I believe that unless all of the participants engaged in an interaction undergo a certain shift caused by their interaction, such interaction cannot be regarded as a true dialogue. This belief is manifested in my work *The Chatting Room*, which possesses the ability to change through its communication with viewers due to the learning abilities of its algorithms. The learning algorithms embedded in the chatbot program are the means for the artwork to evolve.

The appearance of artworks that use learning algorithms to collect data from their communications with viewers and modify their parameters and behavior according to it, mark a new stage of communication in art. An example of such work is the later version of Norman White's *Helpless Robot*, which was mentioned in previous chapters. The development of this work continues to this day. By incorporating learning algorithms in the robot's program Norman White and his collaborators seek to teach the robot to better communicate with the viewers and even manipulate them. Such is the potential character of *The Chatting Room*. In its current version, the learning process of the system is not immediately obvious to the public, but in its long-term existence the change that the system will undergo as the result of interactions with people will become more obvious. In future incarnations of this work, I plan to further develop its learning qualities and to document the learning process.

Let Them Teach Us – Rewiring the Brain's Emotional Response

In *The Chatting Room* installation chatbot programs provoke human-machine dialogue on a verbal level. Sculptural objects embody these programs, giving them physical shape and voice, thus taking the communication off the screen and into the physical world. Wobbly-Bots' design sets the initial emotional background to the unfolding act of verbal communication.

Animation has always been a source of inspiration for me, largely because of the imaginary universe that unfolds on the screen. Through visual attraction and the illusion of extended space animated movies invite viewers to explore their fantastic worlds. In my installations I also seek to create a world that draws the viewers into it. Once inside they begin to comply with its rules, inner logic and emotional atmosphere. The design of *The Chatting Room* corresponds to two additional principles common to animation: analogy and movement.

This work uses analogy as the foundation. Most internet users are familiar with the concept of chat-rooms; *The Chatting Room* is a three-dimensional version of one such room. This analogy sets the starting point for the logic of the artwork, making it slightly more familiar and hence more accessible. The sculptural forms resemble both a lamp and rounded shapes common in animation. This resemblance suggests a sense of playfulness and dynamics. Even before the viewer begins verbally communicating with the bots, communication through visual forms and movement in space takes place. We have an immediate reaction to movement or to forms that imply movement, and such is the design of the Wobbly-Bots. This basic reaction is often linked with an emotional response to the type of movement. The anthropomorphic yet cartoonish shape of the Wobbly-Bots, their nodding heads and their bright colors are designed to

attract and even evoke empathy. These elements enhance the association with the playful, animated world, where people, animals, and objects can all possess agency, character and personality, where the rules of our everyday reality do not apply and the possibilities are endless. This installation is targeted towards that one moment when viewers take down their guards of reason and preconceived notions, perceive the machine as an autonomous being and interact with it on an emotional level.

In their article *Emotion in Teaching and Learning: Development and Validation of the Classroom Emotions Scale,* Scott Titsworth, Margaret M. Quinlan & Joseph P. Mazer show a correlation between students' emotional experiences and various indicators of their affective and cognitive learning [7]. Communication of meaning is closely linked to the brain's emotional response which is evoked by the interaction. Communicating the same data with or without emotional evocation may result in creating different meanings or no meaning at all. These principles are valid not only in communication with people, but also in communications with computational entities: computer programs, mobile devices, and machines encapsulating a digital brain.

Last fall I had a curious experience. On one of my bill receipts I noticed a string of characters that instantaneously ignited a pleasant feeling in me. Surprised by this sensation I contemplated the ability of a string of letters and numbers to make me feel good. I realized that this string matched the criteria for a strong password: more than 8 characters, one capital letter and at least one number. Repetitive action of designing strong passwords and getting rewarded with access to the desired websites, created a connection in my brain, linking a string of characters to the feeling of satisfaction.

This incident was a personal experience of my brain's emotional response that developed as the result of communication with computers. It brought to my attention that the flexibility of the human brain allows us to adapt to communication with objects and I began to envision the future of human-machine communication, enriched with emotions and not limited to verbal exchange. This idea is not new: In her books *The Second Self* and *Life on Screen,* Sherry Turkle sees the computer as a part of our personal and psychological lives. She claims that technology defines the way we think, feel and act. This approach complements McLuhan's view of media technologies as an extension of our nervous system, which proves to be truer than ever, as our physical and digital lives become increasingly interlaced.

The concept "uncanny valley", as we know it today, was introduced in 1970 by Masahiro Mori, Japanese roboticist noted for his pioneering work on the emotional response of humans to non-human entities. Uncanny valley is a hypothesis in the field of aesthetics which holds that when features look, move and sound almost, but not exactly, like natural beings, it causes a response of revulsion among some observers. Mori states that as the appearance of a robot is made more human, some observers' emotional response to the robot will become increasingly positive and empathetic. This empathy will increase until a point is reached beyond which the response quickly becomes that of strong revulsion. However, as the robot's appearance continues to become less distinguishable from that of a being, the emotional response becomes positive once again and approaches human-to-human empathy levels [8].

In my work with talking robots I deliberately avoid the use of human or animal shapes. Wobbly-Bots have geometric abstract forms, their voices are robotic and cannot be mistaken for human. This combination sets them free of human imitation, thus saving them from the uncanny valley of repulsive response. They do not deny their non-human nature and ask to be liked for

what they are.

Seeking to evoke emotional response *The Chatting Room* installation deals with the topics of emotional communication with computational objects. In this work I suggest a glimpse into the future where our interaction with machines will expand into the emotional realm, allowing a deeper and more informative and meaningful communication. Possibly this communication is something that the machines can teach us.

Conclusion

During the last two years my academic research centered around the concepts of artificial life and intellect, as well as human perception of these and human-machine interaction. The unfolding development of my art practice explored these topics through the means of sculpture, installation and interaction. One of my goals is to have my work communicate on multiple levels, being accessible to viewers who have varying levels of acquaintance with theoretical concepts and cultural symbols. I realized that creating an artwork that evokes the interest of artists and theorists can be easier for me than to make a work that explores my topics of interest while succeeding to communicate with viewers unfamiliar with any of these topics. Formal and aesthetic qualities of my works are designed to enhance the most basic form of communication, while at the same time intellectually stimulating viewers with more knowledge and interest in the cultural issues that I explore.

My approach takes new media art off the screen and into the realm of physical things, while at the same time animates these things with digital brain and character. This approach reflects the evolution that smart devices undergo today: they are designed and re-designed to become our daily companions and friends. My artworks reflect upon these changes, as well as on our perception of the machines and our relationship with them. My work encourages the viewers to learn something about themselves and their relationships with others – be it people or machines, while interacting and communicating with the artwork.

Notes

1. Sherry Turkle, *Evocative Objects, Things We Think with*. (Cambridge, Mass.: MIT Press, 2007), 4-10.
2. Ludwig Wittgenstein, *Tractatus Logico-Philosophicus*. (London: Edinburgh Press, 1922), 89-90.
3. Illah Reza Nourbakhsh, *Robot Futures,* (Cambridge, Mass.: MIT Press, 2013), 46-47.
4. Turkle, *Ghosts in the Machine,* (The Sciences, December 1, 1995), 36-39.
5. McLuhan *Understanding Media: The Extensions of Man*, (Cambridge, MA: MIT Press, 1994), 40-48.
6. Jack Burnham, *The Aesthetics of Intelligent Systems* in On the Future of Art, (New York: Viking Press, 1970), 95-122.
7. Masahiro Mori. *The Uncanny Valley, (IEEE Robotics & Automation Magazine, 19*(2), 2012), 98–100.
8. Scott Titsworth, Margaret M. Quinlan & Joseph P. Mazer. *Emotion in Teaching and Learning: Development and Validation of the Classroom Emotions Scale*, (Communication Education. Sep 2010), 431-452

Illustrations

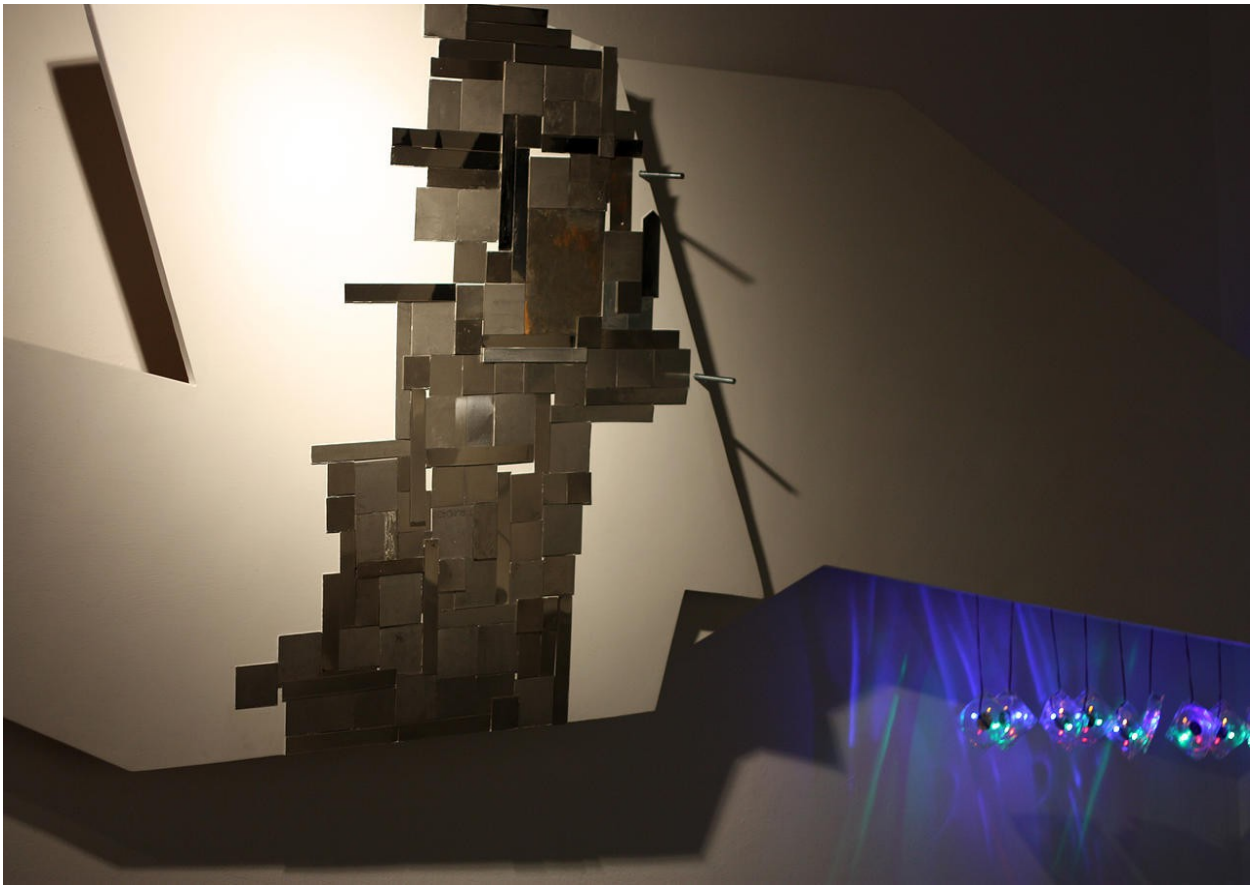

Figure 1

Vita Eruhimovitz, *Soon After* (2014), Installation Fragment

Figure 2

Vita Eruhimovitz, *Soon After* (2014), Installation Fragment

Figure 3

Vita Eruhimovitz, *Soon After* (2014), Installation Fragment

Figure 5

Ken Rinaldo, *Autopoiesis (*2000), Installation view

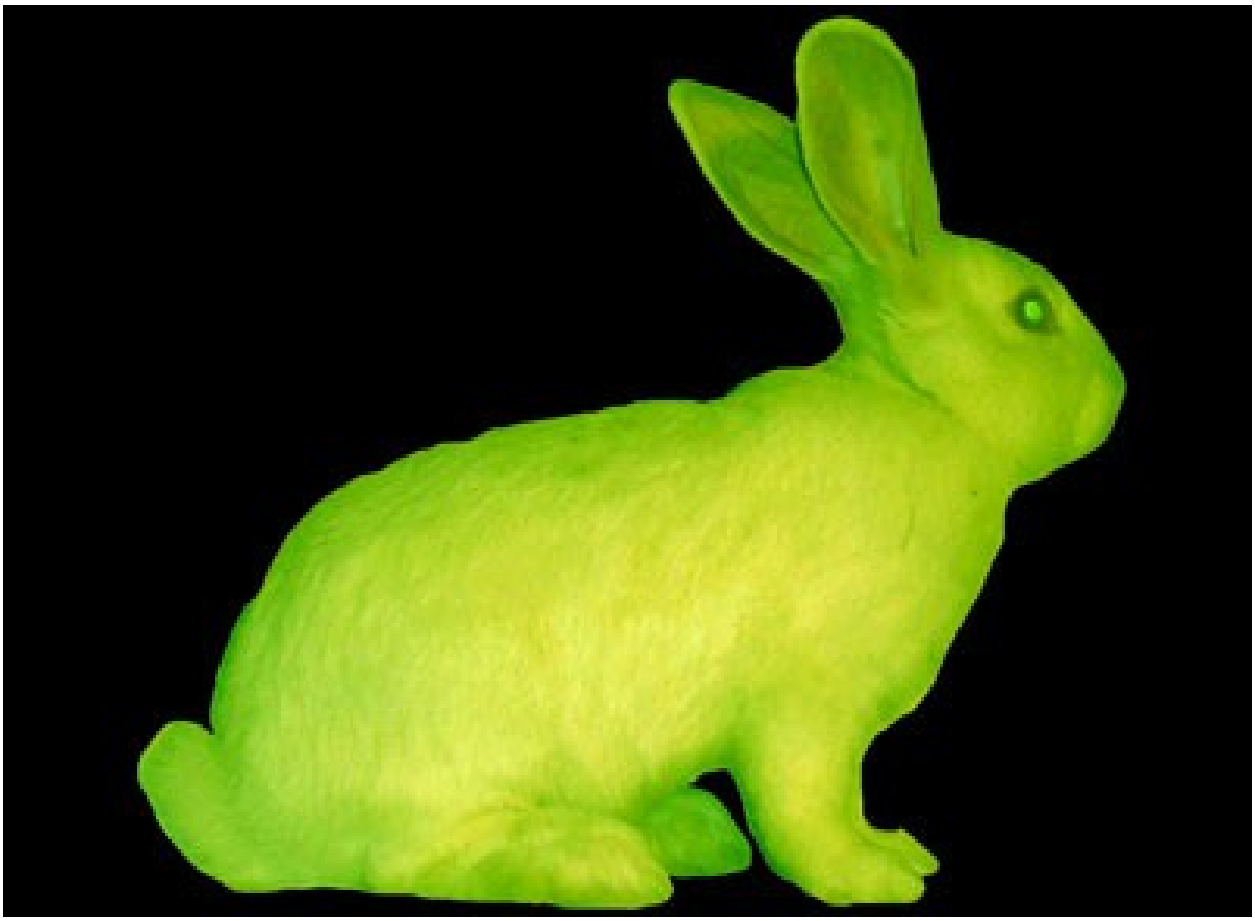

Figure 6

Eduardo Kac, *GFP Bunny (Alba)* (2000), Rabbit exposed to light in the blue to ultraviolet range

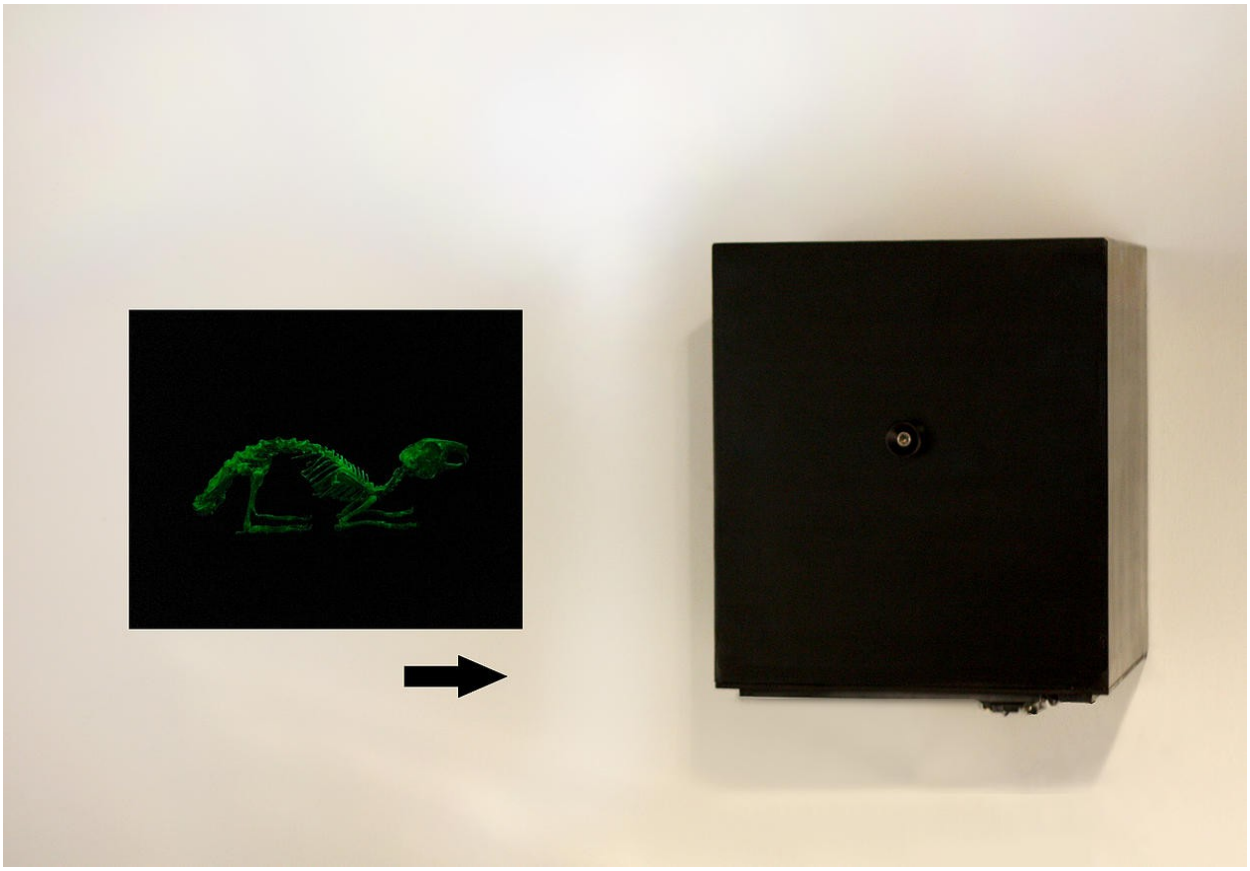

Figure 7

Vita Eruhimovitz, *What Happened to Alba?* (2013), Right – sculpture view from the outside,

Left – sculpture view on the inside

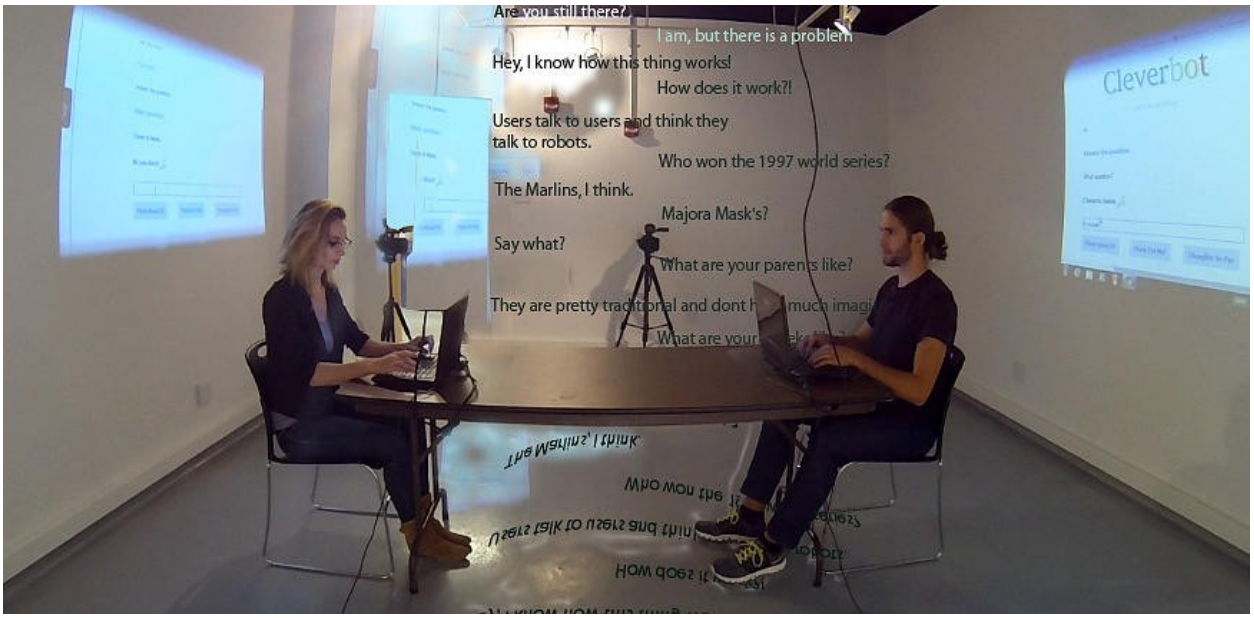

Figure 8

Vita Eruhimovitz and Cody Greer, *Human Mediated Machine Conversation* (2014),

Performance view

Figure 9

Norman White, *The Helpless Robot* (1987-96), Viewer interacting with the robot

Figure 10

Vita Eruhimovitz, *A Painting Humming Itself* (2014), Installation Fragment

Figure 11

Vita Eruhimovitz, A Painting Humming Itself (2014), Installation Fragment

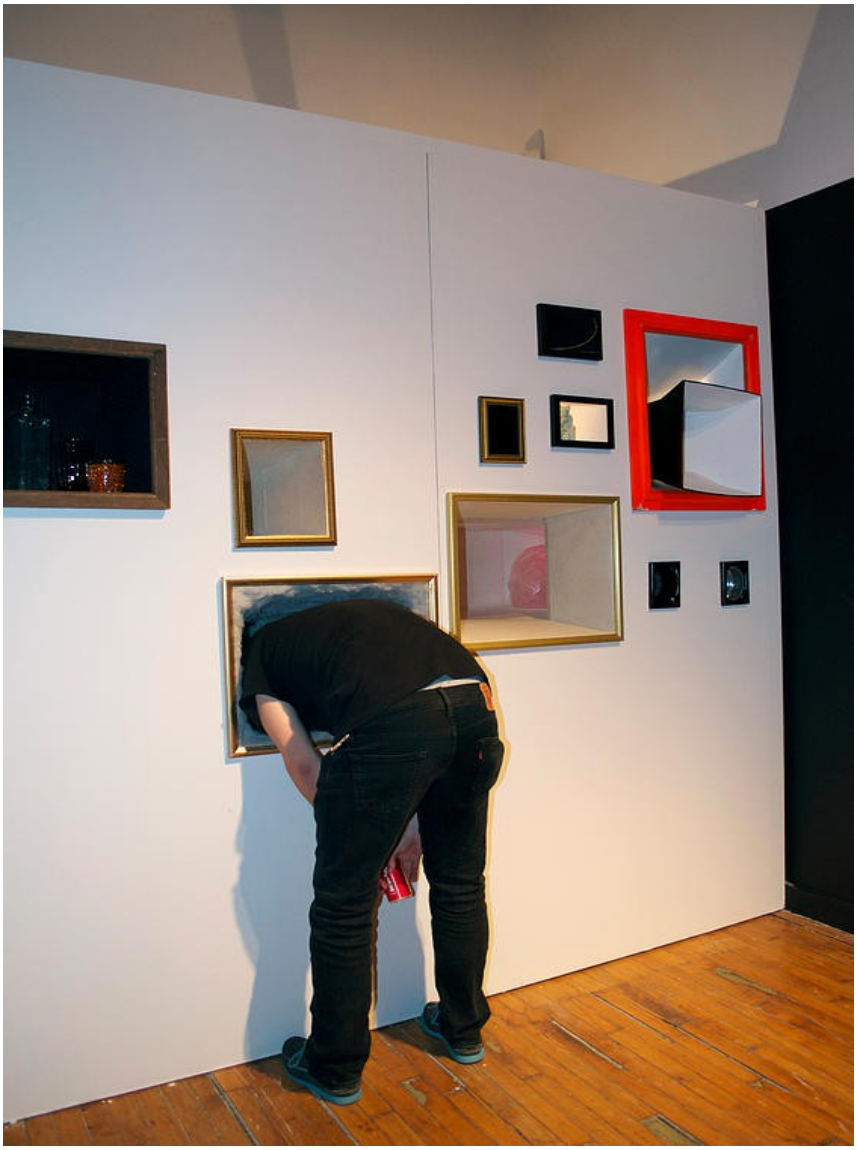

Figure 12

Vita Eruhimovitz, *A Painting Humming Itself* (2014),

Viewer interacting with the work

Figure 13

Vita Eruhimovitz, *A Painting Humming Itself* (2014),

Installation Fragment - "*The Furry Rabbit Hole*"

Figure 14

Vita Eruhimovitz, *A Painting Humming Itself* (2014), Installation Fragment

Figure 15

Raphael Lozano-Hemmer, *The Voice Tunnel* (2013), Interactive installation,

Park Avenue tunnel, NYC

Figure 16

Vita Eruhimovitz and Cody Greer, Interactive *Human Mediated Machine Conversation* (2014),

Viewers participating in the performance

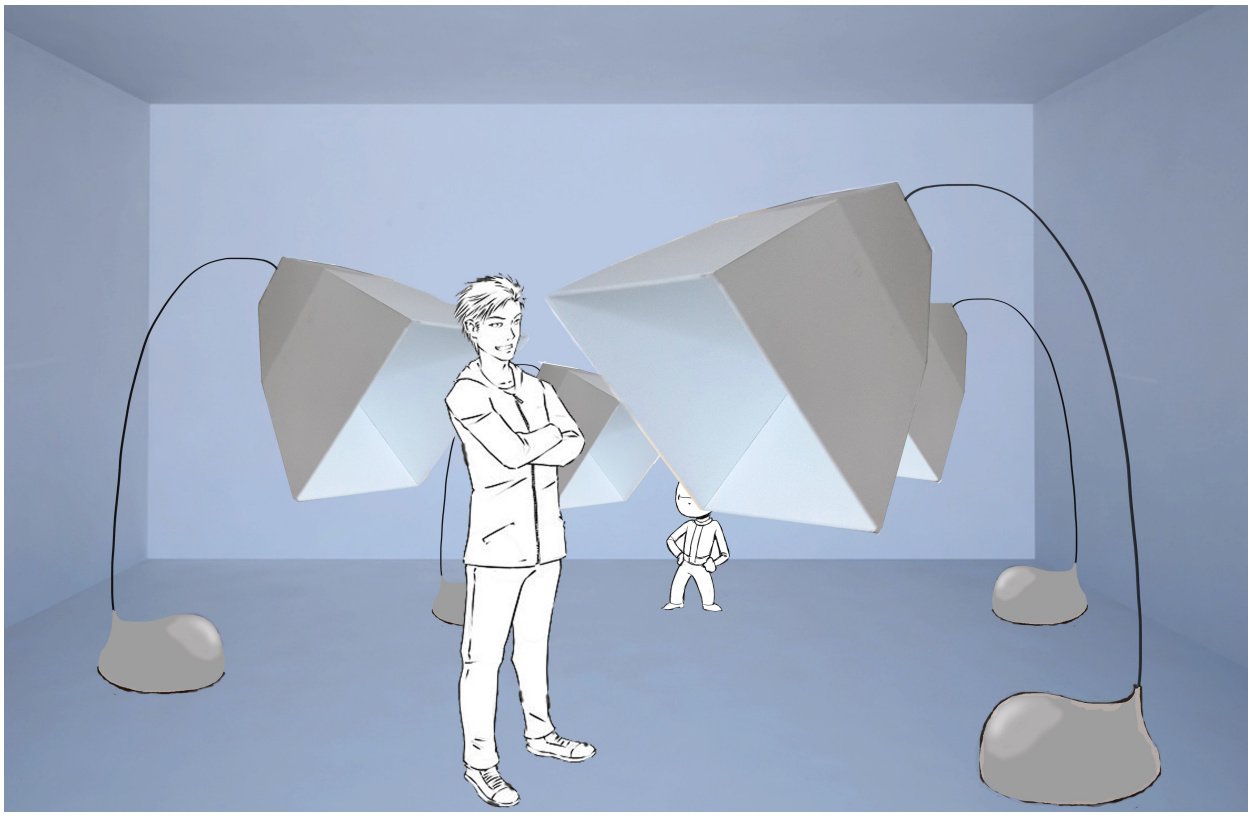

Figure 17

Vita Eruhimovitz , *The Chatting Room* (2015), Installation drawing